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# Endothelial dysfunction and reduced heart rate variability in patients with metabolic syndrome

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## Abstract

© 2018 Copyright E.N. Smirnova et al. According to experts of the World Health Organization (WHO), metabolic syndrome (MS) can be considered as pandemy of the XXI century, because its prevalence among the population of developed countries is about 25-35%. In this study with the purpose of complex investigation of the autonomic nervous system and endothelial function we included 66 patients with MS between the ages of 25 and 61 (46.9±9.9 years). A comparison group of apparently healthy individuals (16 individuals, average age of 45.3±2.3 years; P>0.05) was studied. To evaluate the response of microvascular tone, we used the method of wavelet analysis of skin temperature oscillations during cooling of the limb. All patients underwent the study of heart rate variability. The levels of insulin, endothelin-1, and vascular endothelial growth factor were determined using enzyme immunoassay. Patients with MS had significant differences in all metabolic parameters. Our study showed that in the group of MS there is a decrease of the variability of heart rhythm compared with the healthy group. Conducting cold test revealed signs of endothelial dysfunction in the MS group, which was manifested by the decrease of the index of vasodilation in the endothelial and neurogenic frequency range. In the study group we determined the increase in biochemical markers of endothelial dysfunction, which correlated with parameters of vasodilation. Also, the presence of endothelial dysfunction significantly correlated with signs of reduction of the variability of the heart rhythm.

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## Keywords

Cold test, Endothelial dysfunction, Heart rate variability, Metabolic syndrome

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